UTD Legacy Lane
Hybrid Mobile AR App and Client Applications
Utilizing a RESTful API

Daniel Casper, daniel.casper@utdallas.edu; Lucas Castro, lucas.castro@utdallas.edu; Devon Hayworth, devon.hayworth@utdallas.edu; James Speights, james.speights@utdallas.edu; Marie Standeven, marie.standeven@utdallas.edu

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Department of Computer Science
Erik Jonsson School of Engineering & Computer Science
The University of Texas at Dallas
Richardson, TX 75080, USA

Abstract
Create an Augmented Reality (AR) based application that enables the user to navigate through Legacy Lane and view additional information associated with specific bricks, a site application for the user to view their bricks remotely and to submit a form request to add info to their brick, and an admin site application to monitor the request forms and update the database. Our solution was to write an AR app using React and Wikitude, a website and the admin portal using Angular, and an API using MongoDB and Hapi.JS. The purpose of this project it to create value for University of Texas at Dallas (UTD) Alumni Relations by encouraging alumni donations through this software experience.

Architectural Overview

Client Applications

Two AngularJS front end applications are used for Administrators and End Users. The Administrator app allows updates to data and requires authentication. The End User app allows users to make requests and view data.

Hybrid Mobile AR Application

The mobile application is cross-compiled for Android and iOS using Adobe PhoneGap. React is used to structure the application, and the AR toolkit, Wikitude, provides location, image detection, and 3D model rendering.

RESTful API via Heroku

The backend API is built using the Hapi.js framework, a web framework for Node.js, and runs in a Heroku container. Basic auth supports access control for protected administrator routes. All communication with the API is encrypted.

mLab MongoDB Database

MongoDB provides persistent storage. Text indexes support search. Only the backend API can communicate with the database over an encrypted connection.

Performance

- Able to navigate users to within 3 – 7 meters of a brick using GPS
- UTD brand standards were observed throughout UI development
- All functional goals were met for mobile, web, and backend applications
- Data in-transit and passwords are encrypted
- Strict model validation on all payload and response objects

Results

- Hybrid mobile apps can deliver performance required for AR applications, reducing development and maintenance
- GPS accuracy is limited; precise navigation within 3 meters requires beacon technology or anchor objects at site
- Heroku provides a simple way to host and deliver software, including database add-ons, continuous integration, and SSL support
- Hapi.js provides rich ecosystem of tools which support OpenAPI documentation, testing, and model validation
- The latest version of the Angular framework is highly extensible, reducing the effort to add new features or change services components consume

Impact

- Administrators can update brick information in real-time
- Alumni, donors, and guests can now find their donated brick
- Alumni, donors, and guests can update their brick information
- Link to brick donation page on End User Application to increase donation of additional bricks to Legacy Lane

Summary

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